

What is claimed is:

1 1. A communication system for transporting Internet protocol-formatted
2 communications over a Universal Mobile Telecommunications System (UMTS) wireless
3 communications system, the communication system including a base station and a radio network
4 controller, the communication system further comprising:

5 an inter-working gateway adapted for interconnection to the radio network controller and
6 the base station, the inter-working gateway being adapted to communicate via Internet transport
7 protocols and UMTS-based transport protocols, the inter-working gateway being further adapted
8 to reformat communications with movable UMTS-based radio-controlled network layer
9 protocols for transport to the radio network controller and to reformat communications with
10 movable Internet radio-controlled network layer protocols for transport to the base station.

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12 2. The communications system as recited in claim 1, wherein the UMTS
13 communications system exists at an installed site.

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2 3. The communications system as recited in claim 1, wherein the inter-working
3 gateway is supplied as pre-installed with the transport protocols.

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2 4. The communications system as recited in claim 1, wherein the inter-working
3 gateway is adapted to receive and download the radio-controlled network layer protocols and the
4 transport protocols from the base station.

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2 5. The communications system as recited in claim 1, wherein the base station and
3 the inter-working gateway are interconnected in a local area network.

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2 6. The communications system as recited in claim 1, further comprising:
3 an SDRAM memory;
4 one or more channel elements, each comprising a digital signal processor and associated
5 flash memory and an application specific integrated circuit to manage baseband processing; and

6 a microprocessor for configuring each channel element, storing user data in the SDRAM
7 memory, and exchanging user data with the digital signal processor.

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2 7. The communications system as recited in claim 1, wherein an interconnection of
3 the inter-working gateway with the base station carries the communications reformatted with the
4 movable UMTS-based radio-controlled network layer protocols in a first direction, and the
5 communications reformatted with the movable Internet radio-controlled network layer protocols
6 in a second direction.

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2 8. The communications system as recited in claim 1, wherein an interconnection of
3 the inter-working gateway with the radio network controller carries the communications
4 reformatted with the movable UMTS-based radio-controlled network layer protocols in a first
5 direction, and the communications reformatted with the movable Internet radio-controlled
6 network layer protocols in a second direction.

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2 9. The communications system as recited in claim 1, wherein
3 an interconnection of the inter-working gateway with the base station carries the
4 communications reformatted with the movable UMTS-based radio-controlled network layer
5 protocols in a first direction, and the communications reformatted with the movable Internet
6 radio-controlled network layer protocols in a second direction, and

7 an interconnection of the inter-working gateway with the radio network controller carries
8 the communications reformatted with the movable UMTS-based radio-controlled network layer
9 protocols in a first direction, and the communications formatted with the movable Internet radio-
10 controlled network layer protocols in a second direction.

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2 10. The communications system as recited in claim 1, further comprising:
3 a Node-B base station adapted for transmitting and receiving cellular telephone
4 communications, the Node-B base station being interconnected with the radio network controller
5 for exchanging wireless cellular telephone communications.

2 11. The communications system as recited in claim 10, wherein the UMTS
3 communications system exists at an installed site.

2 12. The communications system as recited in claim 10, wherein the inter-working
3 gateway is supplied as pre-installed with the transport protocols.

2 13. The communications system as recited in claim 10, wherein the inter-working
3 gateway is adapted to receive and download the radio-controlled network layer protocols and the
4 transport protocols from the base station.

2 14. The communications system as recited in claim 10, wherein the base station and
3 the inter-working gateway are interconnected in a local area network.

2 15. The communications system as recited in claim 10, further comprising:
3 an SDRAM memory;
4 one or more channel elements each comprising, a digital signal processor and associated
5 flash memory and an application specific integrated circuit to manage baseband processing; and
6 a microprocessor for configuring each channel element, storing user data in the SDRAM
7 memory, exchanging user data with the digital signal processor, and processing the movable
8 protocols.

2 16. The communications system as recited in claim 10, wherein an interconnection of
3 the inter-working gateway with the base station carries the communications reformatted with the
4 movable UMTS-based radio-controlled network layer protocols in a first direction, and the
5 communications reformatted with the movable Internet radio-controlled network layer protocols
6 in a second direction.

2 17. The communications system as recited in claim 10, wherein an interconnection of
3 the inter-working gateway with the radio network controller carries the communications
4 reformatted with the movable UMTS-based radio-controlled network layer protocols in a first

direction, and the communications reformatted with the movable Internet radio-controlled network layer protocols in a second direction.

18. The communications system as recited in claim 10, wherein
an interconnection of the inter-working gateway with the base station carries the communications reformatted with the movable UMTS-based radio-controlled network layer protocols in a first direction, and the communications reformatted with the movable Internet radio-controlled network layer protocols in a second direction, and
an interconnection of the inter-working gateway with the radio network controller carries the communications reformatted with the movable UMTS-based radio-controlled network layer protocols in a first direction, and the communications reformatted with the movable Internet radio-controlled network layer protocols in a second direction.

19. An inter-working gateway for wirelessly transporting Internet protocol-formatted communications in a Universal Mobile Telecommunications System (UMTS) communications system, the inter-working gateway comprising:

means for communicating via Internet transport protocols and UMTS-based transport protocols;

means for reformatting communications using movable UMTS-based transport protocols for transport to a radio network controller; and

means for reformatting communications using movable Internet radio-controlled network layer protocols from the radio network controller to the inter-working gateway.

20. A method for transporting Internet protocol-formatted communications over a Universal Mobile Telecommunications System (UMTS) wireless communications system, the method comprising:

segmenting Internet-formatted communications into Internet framing protocol-protocol data units (FP-PDUs);

multiplexing the FP-PDUs over separate label switched paths via multiple protocol label switching (MPLS); and

19 exchanging the multiplexed FP-PDUs as formatted multiplexed MPLS data segments
20 between a base station and a radio network controller.

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22 21. The method as recited in claim 20, further comprising:
23 installing radio-controlled network protocols in an inter-working gateway interconnected
24 between the base station and the radio network controller.

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2 22. The method as recited in claim 20, further comprising:
3 segmenting the Internet-formatted communications into FP-PDUs of 350 octets
4 maximum length.

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2 23. The method as recited in claim 20, further comprising:
3 formatting the FP-PDUs with UMTS radio-controlled network layer protocols for
4 transport in the UMTS wireless communications system; and
5 formatting the FP-PDUs with Internet radio-controlled network layer protocols for
6 transmission as wireless Internet communications.

24. The method as recited in claim 21, further comprising:
transporting the FP-PDUs formatted with UMTS radio-controlled network layer
10 protocols from the base station in a first direction; and
transporting the FP-PDUs formatted with Internet radio-controlled network layer
protocols in a second direction.

15 25. A method for transporting Internet protocol-formatted communications
over a Universal Mobile Telecommunications System (UMTS) wireless communications
system, the UMTS communication system including a base station and a radio network
controller, the communication system comprising:

reformatting communications using movable UMTS-based radio-controlled
network layer protocols for transport between the base station and the radio network
20 controller; and

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reformatting communications using movable Internet radio-controlled network layer protocols for transport between the base station and the radio network controller.